

ROUTINE

MWO effective date is 1 February 1999 and completion date is 1 January 2013.

MWO 9-1025-211-30-2

MODIFICATION WORK ORDER

**MODIFICATION OF HOWITZER, MEDIUM, TOWED: 155-MM, M198
(1025-01-026-6648) (EIC: 3EL)**

Headquarters, U.S. Army Tank Automotive and Armament Command

28 February 1999

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeps.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax, or email your letter, DA Form 2028, or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. The email address is amsta-ac-nml@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726. Marine Corps users submit NAVMC 10772 to: Commander, Marine Corps Logistics Bases (Code 850), Albany, GA 31704-5000. Marine Corps units should also respond to MARCORSSYSCOM Attn: (CBG) with a copy of NAVMC 10722 or via Naval message.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. PURPOSE. The purpose of this modification is to add an automated lifting system to the M198 Towed Howitzer. The modification will tie into the existing system and add a hydraulic pump, a filter, and a solenoid box to the bottom carriage. The NATO receptacle for powering the system will be located on the rear of the left trail below the saddle. The on/off switch for the system will be located next to the selector valves. This modification will not disable the existing system, so the existing system will still be available for use.

2. PRIORITY. This modification is classified ROUTINE.

3. END ITEM(S) OR SYSTEM(S) TO BE MODIFIED. See Table 1.

Table 1. End Item or System To Be Modified.

Nomenclature	NSN	Part Number	CAGEC	Model Number	Serial Number
Howitzer, Medium Towed: 155-MM, M198	1025-01-026-6648	12008000	19204	M198	TBD

4. MODULE(S) (COMPONENTS, ASSEMBLIES, SUBASSEMBLIES, BOARDS, AND CARDS) TO BE MODIFIED. The following items, whether installed or in PLL/ASL or depot stock, shall be modified. Table 2 lists the assemblies which require modification.

Table 2. Items To Be Modified.

Nomenclature	NSN	CAGEC	Part Number
*Bottom Carriage Assembly		19204	12008300
*Shield, Manifold Assembly	1025-01-038-7459	19204	12008899
*Trail Carriage, Artillery	1025-01-380-9857	19200	12009206

*Depot Stock must support old configuration. Not all M198 Howitzers in the fleet will be modified with HyPAK. Parts will be modified in the field by the procuring unit before installation onto the howitzer.

5. PARTS TO BE MODIFIED. The following items, whether installed or in PLL/ASL or depot stock, shall be modified. Stocked parts shall be modified prior to issue and shall be marked so that it can be easily determined that modification has been accomplished. The parts which require modification are listed in Table 3.

Table 3. Parts To Be Modified.

Nomenclature	NSN	CAGEC	Part Number	Next Higher Assembly
*Bottom Carriage		19204	12008380	12008300
*Cover, Access	5340-01-037-7211	19204	12008772	12008300
*Cover, Access	5340-01-038-5925	19204	12008770	12008300

*Depot Stock must support old configuration. Not all M198 Howitzers in the fleet will be modified with HyPAK. Parts will be modified in the field by the procuring unit before installation onto the howitzer.

6. APPLICATION.

- a. Time Compliance Schedule: MWO effective date is 1 February 1999 and completion date is 1 January 2013.

- b. Lowest Level of Maintenance Authorized To Apply This MWO: The lowest level of maintenance authorized to apply this MWO is Direct Support Maintenance.
- c. Work Force and Man-hour Requirements for Application of the MWO to a Single Unit, End Item, or System: The total man-hours required for a single application of this MWO is as follows:

REQUIREMENTS

WORK FORCE/SKILLS	MAN-HOURS*
U.S. ARMY	
44B10/Welder**	4
44E10/Machinist	6
45B10/Artillery Repairman***	8
U.S. MARINE CORPS	
1361/Welder**	4
2161/Machinist	6
2131/Artillery Repairman***	8

*The man-hours shown is the maximum number of hours required to apply the modification. After initial training, it should be possible to modify a howitzer in 8 man-hours (one howitzer per day).

**It is recommended that two individuals be used for welding. One will do the removal of the CARC paint (grinding) and the other will do the actual welding. This should cut the man-hours required in half.

***It is recommended that two individuals be used for assembling the hardware. This should cut the man-hours required in half.

- d. MWOs To Be Applied Prior to or Concurrently with the Application of This MWO: None.

7. TECHNICAL PUBLICATIONS AFFECTED/CHANGED.

Publication Number	Date
TM 9-1025-211-10	January 1991
TM 9-1025-211-20&P	May 1991
TM 9-1025-211-34	May 1991
TM 9-1025-211-34P	August 1997
DMWR 9-1025-211-2	May 1997

8. MWO KIT(S)/PART(S) AND THEIR DISPOSITION.

- a. Kit Needed To Apply the MWO: M198 HyPAK Modification Kit, NSN 1025-01-458-6160, Part Number 12965280, CAGEC 19200, is required to accomplish this MWO. The MWO kit is unclassified, and the shipping data is: Weight: 175 lb (79.45 kg); Dimension: L 38 in. (96.5 cm) x W 20 in. (50.8 cm) x H 25 in. (63.5 cm); Cubic displacement: 10.4 cu ft (0.29 cu m).
- b. Contents of MWO Kit: The parts which are contained in the MWO kit are listed in Table 4.

Table 4. Modification Kit PN 12965280.

Nomenclature	NSN	CAGEC	Part Number	QTY
Gasket	5330-00-641-4336	58536	A-A52481-8	1
Screw, Cap, Hexagon Head	5305-01-420-5112	80204	B1821AH025C050N	1
Screw, Cap, Hexagon Head	5305-01-461-4322	80204	B1821AH025C063L	4
Screw, Cap, Hexagon Head	5305-01-457-8854	80204	B1821AH025C063N	24
Screw, Cap, Hexagon Head	5305-01-389-9145	80204	B1821AH031C088N	4
Bolt, Machine	5306-01-461-4331	80204	B1821AH031C150L	4
Screw, Cap, Hexagon Head	5305-01-458-5388	80204	B1821AH038F075N	1
Screw, Cap, Socket Head	5305-00-978-9372	96906	MS16997-34	4
Screw, Cap, Socket Head	5305-00-978-9356	96906	MS16997-46	4
Screw, Cap, Socket Head	5305-00-983-8084	96906	MS16997-60	4
Screw, Cap, Socket Head	5305-01-080-3764	96906	MS16998-41L	2
Nut, Self-Locking, Hexagon	5310-00-905-8451	96906	MS21083-N06	1
Clamp, Loop	5340-00-057-2904	96906	MS21333-71	8
Elbow, Tube	4730-00-203-3689	96906	MS21908-8	2
Screw, Tapping	5305-00-855-0967	96906	MS24629-37	4
Guard, Switch	5930-00-681-4897	96906	MS25224-3	1
Washer, Flat	5310-00-081-4219	96906	MS27183-12	8
Washer, Flat	5310-01-274-3255	96906	MS27183-52	4
Switch, Toggle	5930-01-436-3612	96906	MS27722-30	1
Screw, Machine	5305-01-458-3598	96906	MS3212-20L	6
Screw, Machine	5305-00-889-3001	96906	MS35206-231	1
Screw, Machine	5305-00-889-3002	96906	MS35206-242	1
Screw, Machine	5305-00-088-9044	96906	MS35207-260	9
Washer, Lock	5310-00-209-0786	96906	MS35335-33	26
Washer, Lock	5310-00-582-5965	96906	MS35338-44	2
Washer, Lock	5310-00-933-8119	96906	MS35338-137	4
Grommet	5325-00-795-0719	96906	MS35489-43	1
Washer, Lock	5310-00-889-2769	96906	MS45904-61	4
Washer, Lock	5310-00-889-2528	96906	MS45904-68	5
Washer, Lock	5310-00-061-1258	96906	MS45904-76	1
Elbow, Tube	4730-01-006-5099	96906	MS51852-11A	2
Tee, Tube	4730-00-997-9914	96906	MS51854-11	2
Nut, Plain, Hexagon	5310-00-269-6717	96906	MS51860-56	2
Screw, Tapping	5305-00-734-7121	96906	MS51861-65C	3
Nut, Self-Locking, Hexagon	5310-00-984-3806	96906	MS51922-9	4

Table 4. Modification Kit PN 12965280. (Cont)

Nomenclature	NSN	CAGEC	Part Number	QTY
Nut, Plain, Hexagon	5310-00-903-5966	96906	MS51971-1	2
Elbow, Tube	4730-01-459-7680	81343	SAE 8-12 080220	2
Connector, Receptacle	5925-01-097-9974	19207	11674728	1
Kit, Intervehicle Power Cable	6150-01-310-1829	19207	11682336-2	1
Gasket	5330-01-039-2523	19204	12008771	4
Gasket	5330-01-032-6495	19204	12008773	2
Gasket	5330-01-031-1476	19204	12008775	1
Pad, Cable		19200	12965257	7
Pad		19200	12965259	1
Cover, Access	5340-01-455-7250	19200	12965262	1
Filter Element, Fluid	4330-01-456-0998	19200	12965266-1*	1
Head, Fluid Filter	2940-01-M26-9606	19200	12965266-2*	1
Bracket, Mounting	5340-01-457-2930	19200	12965271	1
Pad, Cushioning	5340-01-457-2923	19200	12965272	1
Cable Assembly, Special	6150-01-457-2926	19200	12965275	1
Hose Assembly, Nonmetallic	4720-01-459-6078	19200	12965277-1**	1
Hose Assembly, Nonmetallic	4720-01-459-6270	19200	12965277-2**	1
Hose Assembly, Nonmetallic	4720-01-459-6076	19200	12965277-3**	1
Hose Assembly, Nonmetallic	4720-01-459-6131	19200	12965277-4**	1
Hose Assembly, Nonmetallic	5340-01-456-9672	19200	12965277-5**	1
Gasket	5330-01-457-2924	19200	12965278	1
Plate, Mounting	5340-01-456-9672	19200	12965283	1
Cable Assembly, Power	6150-01-456-9671	19200	12965284	1
Cable Assembly, Power	6150-01-456-9667	19200	12965285-1	1
Cable Assembly, Power	6150-01-456-9668	19200	12965285-3	1
Cable Assembly, Special	6150-01-457-2933	19200	12965285-5	1
Cover, Access (Brush)	5340-01-457-2925	19200	12965286	1
Cover, Access (Brush)	5340-01-457-2921	19200	12965287	1
Cover, Access (Brush)	5340-01-455-7252	19200	12965290	1
Box Connector, Electrical	5975-01-191-4814	74545	12965291-1	1
Cover, Access	5340-01-457-2922	19200	12965293	1
Box Connector, Electrical	5975-01-456-0997	19200	12965295	1
Cable Assembly, Power	6150-01-456-9669	19200	12965297-1	1
Cable Assembly, Power	6150-01-456-9670	19200	12965297-3	1
Conduit Outlet	5975-01-457-2929	19200	12965299	1
Pump, Hydraulic	4320-01-455-7253	19200	12965300	1

Table 4. Modification Kit PN 12965280. (Cont)

Nomenclature	NSN	CAGEC	Part Number	QTY
Pad		19200	12965302	1
Pad, Grounding		19200	12965303	1
Connector, Receptacle, Electrical	5306-00-738-2876	19207	7388305	1

* Fluid filter kit parts

** Hose assembly kit parts

c. Bulk and Expendable Material: Table 5 lists the bulk and expendable material required to apply the MWO kit.

Table 5. Bulk and Expendable Material.

Nomenclature	NSN	CAGEC	Part Number	QTY
Argon, Technical	6830-00-169-0779	81349	MIL-A-18455	CF
Bag, Plastic				BX
Band, Rubber	7570-00-243-3437	58536	A-A-131	BG
Cutting/Tapping Fluid	9150-00-252-6371	81348	VVC850	GL
Electrode, Welding (ER 5356)	3439-00-803-9498	31505	AWSA5.10-69 ER5356 0.047	SL
Electrode, Welding (E70S-3)	3439-00-483-8093	31505	AWSA5.4-81/ E505-15	LB
Gasket	5330-01-039-2523	19204	12008771	1
Grease, Aircraft (WTR)	9150-00-944-8953	81349	MIL-G-81322	CN
Grommet, Nonmetallic	5325-00-582-3601	96906	MS35489-38	1
Lubricant, Dry Film	9150-01-260-2534	81349	MIL-L-23398	CN
Hydraulic Fluid (OHT)	9150-00-935-9807	81349	MIL-H-6083	CN
Nut, Plain, Hexagon	5310-00-761-6882	96906	MS51967-2	1
Paint, Black (CARC)	8010-01-229-7540	81349	MIL-C-53039	QT
Paint, Brown (CARC)	8010-01-229-7543	81349	MIL-C-53039	QT
Paint, Green (CARC)	8010-01-229-7546	81349	MIL-C-53039	QT
Plug, End Seal, Electrical Connector	5935-00-235-8970	96906	MS27488-16	1
Primer Coating (CARC)	8010-01-193-0516	81349	MIL-P-53022	KT
Screw, Cap, Socket Head	5305-00-978-9385	96906	MS16997-62	1
Tape, Antiseizing	8030-00-889-3534	81349	MIL-T-27730	EA
Washer, Lock	5310-01-582-5965	96906	MS35338-44	1
Washer, Lock	5310-00-637-9541	96906	MS35338-46	1
Washer, Lock	5310-01-889-2528	96906	MS45904-68	2